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Determinants of Import Demand in Ghana: 1960-2014

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DETERMINANTS OF IMPORT DEMAND IN GHANA : 1960 - 2014

(TITLE)

BY

FREDA OPOKU - AGYEMANG

THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
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DETERMINANTS OF IMPORTS DEMAND IN GHANA: 1960 TO 2014

BY

Freda Opoku-Agyemang

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Table of Contents

List of Figures

List of Tables

List of Appendices

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Abstract

This paper assesses the determinants of demand for import in Ghana using variables imports, exports, real gross domestic product, government spending, capital formation and exchange rate. The central aim of the study is to examine the relationship of Ghana's aggregate import demand and its determinants and then analyze the data from the period 1960 to 2014 and based on the above objectives, propose policies based on the results obtained from the analysis. All the data used were obtained from the World Bank database. The Johansen co-integration test suggested that there exists a long-run relationship between the imports (i.e. the dependent variable) and exports, government spending, investment, GDP and exchange rate (i.e. the independent variables). In addition, the Granger-Causality test revealed a unidirectional causality between exports and imports. Overall, exports, real GDP, exchange rate and capital formation exhibited a positive and significant impact on import demand in Ghana.

Keywords: Ghana, imports, exports, import substitution, imperfect substitution model

CHAPTER ONE

1.0 INTRODUCTION

International trade is the exchange of goods and services across national boundaries. It is the most traditional form of international business activity; this has played a major role in shaping world history. It is also the first type of foreign business operation undertaken by most companies because importing or exporting requires the least commitment of, and risk to, the company's resources.

The importance of international trade in the development process has been of interest to development economists. International trade allows manufacturers and distributors to seek out products, services and components produced in foreign countries. Trade also enables firms to acquire resources that are not available at home. Besides providing consumers with a variety of goods and services, international trade increases incomes and employment. In the recent years, because of the popularity of globalization, the interdependence among countries at the world level has increased.

A country cannot only rely on the goods they produce domestically but resort to goods elsewhere. Popular traditional theories of trade such as the absolute advantage and comparative advantage make the trade concept simple by highlighting the importance of trade. Both theories especially the comparative advantage shows the benefits countries gain whenever they indulge in trade.

In order to promote locally produced goods, countries consider reducing imports through programs such as the import substitution strategy. Many underdeveloped countries of which Ghana is not an exception adopted this import substitution strategy but unfortunately, for them it

did not turn out as expected. Ghana adopted policies aimed at industrialization and at replacing imports by domestic production and the result was balance of payment problems.

1.1 PROBLEM STATEMENT

Trade economists can be grouped into two; trade optimists and trade pessimists. Trade optimists are those who advocate free trade policies whereas trade pessimists are those who believe in fair trade and not free trade (Chani et al, 2011). However, due to globalization, the views of the trade optimists are dominant. For example, the establishment of World Trade Organization has promoted free trade among countries and has increased imports of those countries like Ghana who rely heavily on imported goods from other countries. This has become a major concern for these countries due to the problem of persistent negative trade deficits.

On the one hand, trade deficit refers to a situation where the merchandise imports of a country exceed the merchandise exports. The trade deficit of Ghana just like any other country is often viewed with great alarm and has attracted considerable attention from both policy makers and the public at large. On the other hand, much of the uneasiness about Ghana's trade deficit can quite simply be attributed to the term "deficit" itself, which has negative connotations (Attah, 2011).

To decrease the dependence on developed countries and increase self-sufficiency, Ghana adopted the import substitution industrialization in order to achieve this goal. Notwithstanding the implications of the policy, the result was a decline for foreign exchange generated into the country. This was because the country's exports were not sufficient to generate enough foreign exchange reserves for the country. In addition, the main reason why the policy was implemented was not met since import demand kept increasing on a higher pace (Harvey, 2012). This was not good news for the country because its trade balance kept deteriorating into the negatives. Trends

in Ghana's imports show that it has been increasing strongly, particularly over the past three decades. During the past five years the imports of Ghana have increased at an annualized rate of 13.7% of GDP from $7.8 billion in 2009 to $14.8 billion in 2004. As of 2014, Ghana had a trade balance of $4.62 billion in net imports as compared to the trade balance in 1995 that was still a negative balance of $484 million in net imports. Like most developing economies, Ghana's imports are heavily dependent upon machinery and transport equipment, energy and manufactured goods, rice, newspapers and even tooth picks. The strong demand for imports has led to imbalances in Ghana's external accounts, trade deficits are still in place and policy makers seem to do little about the situation. Therefore, it has become imperative to examine what determines Ghana's imports.

1.2 RESEARCH OBJECTIVES:

The main objective of the study is to examine the determinants of import demand of Ghana. Specifically, the paper seeks to:

- Investigate the causality between Ghana's imports and exports
- Examine the impact of innovations in the explanatory variables on import demand
- Determine certain policies needed to reduce chronic deficit in Ghana's trade balance

1.3 SIGNIFICANCE OF THE STUDY:

This paper makes diverse contributions to the existing literature. First, this is the first paper to assess these dual questions of growth impacts and determinants of imports with the most recent

time series data on Ghana. Second and perhaps more importantly, in most developing countries, the concept of imports has conflicting views. This is because looking at the trade balance, an increase in imports only results in a trade deficit. In contrast, a reduction or restriction in a country's import will lead to the fall in the tariff revenue as well as make worse the inflationary tendencies of the domestic country. To deal with this dilemma, the paper will be of much help if we are able to estimate what determines or drive the demand of Ghana's imports and to examine the relationship between import demand and its determinants. In addition, it will provide policy makers with empirical evidence on the major determinants of Ghana's imports which will help them formulate better strategies to improve the balance of trade problems and the economy. This fills in some gaps in the literature.

1.4 ORGANIZATION OF THE STUDY:

The paper is in five different chapters and organized as follows: the introduction is the first chapter followed by the literature review, the second chapter. Methodology is laid out in the third chapter whereas the fourth chapter consists of the data analysis with the summary and conclusion being the last chapter.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 The Sectors of the Ghanaian Economy

The Ghanaian economy is constituted in three main sectors: Agriculture, Industry and Services. The agriculture sector over the past seven decades has been Ghana's major contributor to the economy, as this is typical of an underdeveloped country. In 1960, the agriculture sector accounted for 51.1% of GDP and 61.8% of the labor force. In 1978, the GDP share of agriculture increased further to 60.7% while the services and industry sectors collapsed. However, in the late 1970s and the early 1980s, the services sector resumed its expansion in the late 1970s and early 1980s, while the industrial output only returned to its pre-crisis level in 1986 (Jedwab et. al., 2012). Even though the agriculture sector was considered as the backbone of Ghana's economy, as of 2016, the services sector remains the largest contributor to the Ghanaian economy with a percentage share of 56.5, industry sector with a percentage share of 24.4 and agriculture with a percentage share of 19.1 (Ghana Statistical Services, 2016).

Agriculture: The share of agriculture in GDP and employment has remained almost unchanged between 1960 and 2006 with the exception of the 1967-1984 periods. This is because during this period, the economy was contracting and the contributions of GDP and employment of the industrial and services sectors were declining. The reason for this lack of development was due to food shortages that forced farmers to remain producers in the food sector. According to the Food and Agriculture Organization (2010), Ghanaians derived 71.2% of their calorie intakes and 58.7% of their protein intakes from cereals and starchy roots. Cocoa production also declined in the 1960s due to low producer prices. There were also policies implemented to restrict migration

after 1969 and the drought in the early 1980s all accounted for the lack of development of the agriculture sector. The agricultural sector recorded the lowest growth rate of 5.2 % in 2013 and the share of GDP declining from 23.0% in 2012 to 22.0% in 2013.

Industry: This sector consists of manufacturing, public utilities and construction. During the reign of the first president in Ghana, Kwame Nkrumah, industrialization was considered the only source for development. Hence, the Nkrumah government invested massively in the 1960s and 1970s that led to a slight increase in the GDP and employment shares of manufacturing. In 1976, per capita income dropped which led to the contraction of the manufacturing sector and as a result low productivity. The mining sector also collapsed in the 1960s and 1970s due to low investment and poor maintenance. The manufacturing subsector has been the main dominance of the industry sector over years. This is mainly attributed to the discovery and production of oil and gas in Ghana in 2010. The Ghana Statistical Services recorded the sector as the second largest in 2013, as a result boosting economic growth of 18% in 2013.

Services: This sector constitutes five subsectors: wholesale and trade (i.e. imports and exports), hotels and restaurants, government services, "finance, real estate and business services", "transport, storage and communications" and "community, social and personal services". The 1978-1986 economic crisis caused the trade sector to shrink relatively less than the other sectors. However, the imports and exports sector increased even further because of the Ghanaian economy's exposure to globalization and tourism. The increase in the number of tourists entering Ghana has made the sector very lucrative for the country. According to the ministry of tourism, Ghana's tourism sector annually makes almost $1.1 billion in foreign exchange earnings that contributes about 4% of the GDP and offers 220,000 direct formal employments nationwide.

In addition, statistics show that this sector is the major contributor to the GDP of Ghana; contributing about half (49.5%) of GDP in 2013. Information and communication activities recorded the highest growth rates of about 23.2% and 24.7% respectively. (Ghana Statistical Services, 2013)

Table 1: Sectors of the Ghanaian Economy

	2009	2010	2011	2012	2013
AGRICULTURE	31.8	29.8	25.3	23.0	22.0
Crops	23.6	21.7	19.1	17.3	16.9
o.w. Cocoa	2.5	3.2	3.6	2.6	2.2
Livestock	2.0	2.0	1.8	1.6	1.5
Forestry and Logging	3.7	3.7	2.8	2.6	2.2
Fishing	2.5	2.3	1.7	1.5	1.4
INDUSTRY	19.0	19.1	25.6	28.6	28.6
Mining and Quarrying	2.1	2.3	8.4	9.5	9.8
o.w. Crude Oil	-	0.4	6.7	7.8	8.1
Manufacturing	6.9	6.8	6.9	6.4	5.8
Electricity	0.5	0.6	0.5	0.5	0.5
Water and Sewerage	0.7	0.8	0.8	0.7	0.6
Construction	8.8	8.5	8.9	11.5	11.8
SERVICES	49.2	51.1	49.1	48.4	49.5
Exports and Imports; Repair of Vehicles, Household goods	5.9	6.2	5.9	5.3	4.9
Hotels and Restaurants	6.2	6.0	5.4	4.7	4.3
Transport and Storage	10.5	10.6	10.7	10.9	11.2
Information and Communication	1.8	1.9	1.8	2.2	2.4
Financial and Insurance Activities	4.3	5.2	4.4	4.8	6.5
Real Estate, Professional	4.1	4.5	4.6	4.6	4.4
Public Administration and Defense	7.0	7.0	7.0	6.8	6.9
Education	4.2	4.3	4.1	4.3	4.2
Health and Social Work	1.4	1.6	4.1	1.3	1.2
Community, Social & Personal Service Activities	3.7	4.0	1.3	3.5	3.4
	100.0	100.0	100.0	100.0	100.0

Source: Ghana Statistical Service, 2013. Units are in percentages of GDP

2.2 Evolution of Ghana's Trade

Before Independence:

Ghana, formerly known as the Gold Coast, is a country endowed with gold and oil palms and situated between the trans-Saharan trade routes and the African coastline. This country has been involved in all phases of Africa's economic development during the last thousand years. As early as the thirteenth century, present-day Ghana was drawn into long-distance trade because of its gold. This attracted the European traders as well as the Portuguese and the British. In 1482, the Portuguese built a fortified trading post at Elmina (a town in the Central Region) and began purchasing gold, ivory and pepper from African coastal merchants. While the main exports of Ghana were gold, ivory, kola nut and pepper, the introduction of the trans-Atlantic slave trade changed the nature of exports. At this point, human beings were exported in addition to the gold, ivory and kola nut in exchange for guns, gunpowder and the like. After the abolishment of the slave trade, the British gained control over the region and encouraged the production of oil palm, timber and gold. In 1878, cocoa trees were introduced from the Americas (esp. Mexico) and this became Ghana's major export. Legitimate trade restored the productivity of Ghana's economy but the invasion of European goods displaced indigenous industries.

After Independence:

In 1957, the year in which Ghana gained independence from the British, the economy appeared to be stable and flourishing. The country was still the world's leading producer of cocoa. The president at the time, Dr. Kwame Nkrumah, sought to use the stability of the economy as a

facilitator for economic diversification and expansion by moving Ghana form a primarily agricultural economy to a mixed economy. When Kwame Nkrumah came to power, he had large reserves of funds and a cocoa industry that was generating more funds. Using cocoa revenues as security, Dr. Nkrumah took out loans to establish industries that would produce import substitutes as well as process many of Ghana's exports. Unfortunately, the price of cocoa collapsed in the mid-1960s, destroying the fundamental stability of the economy.

Since the start of the Economic Recovery Program (ERP) in 1983, the government has introduced several policies to adjust the pattern of Ghana's trade structure. These include devaluing the currency as well as raising producer prices for crucial exports such as cocoa to offset the advantages of smuggling such goods across borders. The government also introduced an interbank foreign exchange market to facilitate currency exchange and reduced numerous import duties and trade taxes in order to ease the importation of essential capital goods.

2.3 Trade Agreements

Trade policy occupies a unique place among other policy domains in shaping the environment in which companies establish and operate their businesses. Ghana's trade sector is governed by four main agreements and related protocols.

2.3.1 The World Trade Organization (WTO) Agreements

The World Trade Organization (WTO) is an intergovernmental organization that regulates international trade and deals with rules of trade between nations. The WTO started officially on January 1, 1995 under the Marrakesh Agreement, signed by 123 nations. The WTO replaced the General Agreement on Tariffs and Trade (GATT) that commenced in 1948. The organization,

which has its headquarters in Geneva, Switzerland, comprises 164 member states. Ghana was part of the charter states that joined the organization when it first commenced in January 1, 2005. Since its commencement, the WTO has become the driving force of the institution of globalization and has had both positive and potentially adverse effects on the countries in the world of which Ghana is no exception. It also serves as a negotiation forum by providing a platform that allows member governments to try to sort out their differences and address any trade problems they face with each other. For instance, the WTO has helped lower many trade barriers that restricted trade among member states. It also helps maintain trade barriers when the need arises.

2.3.2 EU Economic Partnership Agreement

Economic Partnership Agreements are a scheme to create a free trade area (FTA) between the European Union and the African, Caribbean and Pacific Group of States (ACP). Ghana, together with West African countries and the EU has been negotiating this agreement to ensure continued favorable access to the European Union market. In addition, one of the goals of the partnership is to design a tool for sustainable development, economic growth and regional integration. The regional EPA provides duty-free and quota-free access to the European Union market for an unlimited period for all imports originating in Ghana. This asymmetric and gradual opening of the Ghanaian market to European goods takes into account the different level of development Ghana and the EU and affords enough flexibility to protect sensitive sectors as well as to preserve fiscal revenues. Liberalized imports from the European Union are mainly goods that are not produced locally, notably inputs used by local producers, such as agricultural inputs, for instance fertilizers and seeds as well as machinery and equipment needed for manufacturing. The benefits associated with the agreement includes increase investment and job creation in

Ghana and the West Africa; intensifying and facilitate trading between Ghana, the region and the EU towards a sustainable economic partnership.

2.3.3 African Growth and Opportunity Act

The African Growth and Opportunity Act (AGOA) is a United States Trade Act, enacted in May 2000. AGOA has since been renewed to 2025. The legislation significantly enhances market access to the US for qualifying Sub-Saharan African (SSA) countries. The purpose of the legislation is to assist the economies of Sub-Saharan Africa and to improve economic relations between the United States and the region. AGOA currently accords over 7,000 products exported from eligible 35 Sub Saharan Countries (including Ghana) preferential tariff treatment. The only condition under this non-reciprocal Trade Agreement is that such goods ought to be certified by Customs Authorities as goods, which are truly products of Ghana. Under AGOA, eligible Ghanaian export products are admissible to the US market duty free and quota free. Production capacity limitations, however, have presented Ghana from taking full advantage of provisions of the Act. Since March of 2002, Ghana has been approved to receive the textile and apparel benefits under the AGOA after having established an effective VISA System. Prior to the approval CEPS had brought into force new Regulations to support the VISA System, i.e. Commissioner's Order No.1 of January 30, 2002.

2.3.4 ECOWAS Trade Liberalization Scheme

The Economic Community of West African States is a 15-member regional group with a mandate of promoting economic integration in all fields of activity of the constituting countries. It was established on May 28, 1975 and the member states include Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria,

Sierra Leone, Senegal and Togo. The ECOWAS Trade Liberalization Scheme (ETLS) is the main ECOWAS operational tool for promoting the West Africa region as a Free Trade Area. The objective of the scheme is to establish a Customs Union among all member states aimed at the total elimination of Customs duties and taxes of equivalent effect, removal of non-tariff barriers and the establishment of a Common Customs External Tariff to protect goods, produced in Member States. The Scheme covers groups of goods such as unprocessed goods (livestock, fish, plant or mineral products that have not undergone any industrial transformation), traditional handicraft products (articles made by hand with or without the help of tools or instruments). This includes wooden cooking utensils, fancy goods, small cabinetwork, mats, carpets, bed linen, footwear, headgear, prepared feathers etc., and industrial products of Community origin.

2.4 Import Substitution Industrialization

The idea behind the import substitution strategy is that by replacing the imports of certain industrial goods by domestic production, the economy will be so modified that it will begin to be more independent, more resilient, more diversified, and better able to generate increasing welfare as a matter of routine. Developing countries may adopt import substitution policies under distinctly different circumstances: as a means of initiating structural change and development. President Kwame Nkrumah, the first president of Ghana, specifically stressed the import-substituting role of domestic manufacturing industries, in order to reduce dependence on former colonial powers for those goods. He saw industrialization as a dynamic development force, not only for diversifying the economic structure, but also for training workers, providing capital for further investment, and motivating Ghanaians.

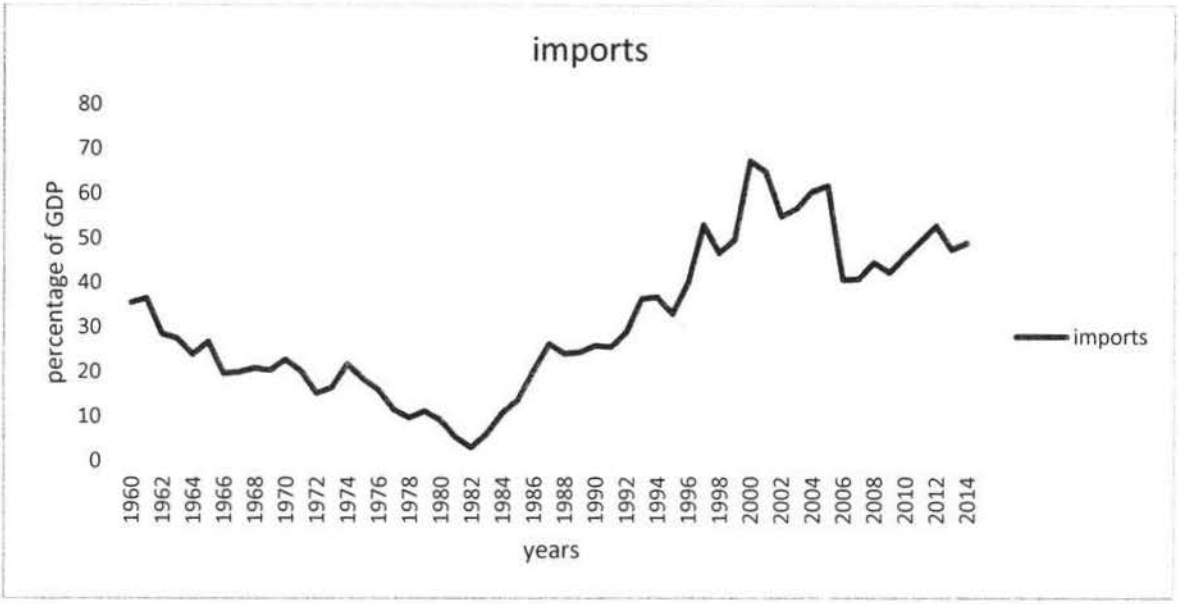
2.4.1 Failure of the Import Substitution Industrialization

Ghana was among the eight African countries who implemented industrialization to the continent. These countries implemented unfavorable policies that led to the downfall of the import substitution strategy. The tendency of many African governments to assign a leading role to the state in creating and operating manufacturing firms simply made the problem worse. Investments were often made with little regard to efficiency, and the managerial capacity of the state was badly overstretched (Page, 2014).

The main difficulties in implementing the import substitution were due to obstacles imposed by the agricultural sector, problems with the balance of payments, lack of human capital and little knowledge of technology. The agriculture sector was expected to support the industrial sector by transferring capital; generating foreign exchange among others but these expectations were not met. However, labor was transferred from the agricultural to the industrial sector. Yet, the output per worker that should have increased did not occur, leading to inconsistency in the economic system. Furthermore, the exchange reserves constraint slowed down the industrialization process. The shortage of human capital and the lack of skilled staff was another factor that contributed to the failure of the import substitution in Ghana. Shortage of capital in trained engineers affected the production mechanism in factories and machine maintenance work. In addition, without qualified executives, it was difficult to establish an institutional structure and bureaucracy capable of regulating and administering the import substitution process. Some authors also suggest that the lack of technological expertise due to the high costs involved in studying technology served as an obstacle to import substitution industrialization. Others again argued that import substitution strategy failed because the industrial policy occurred

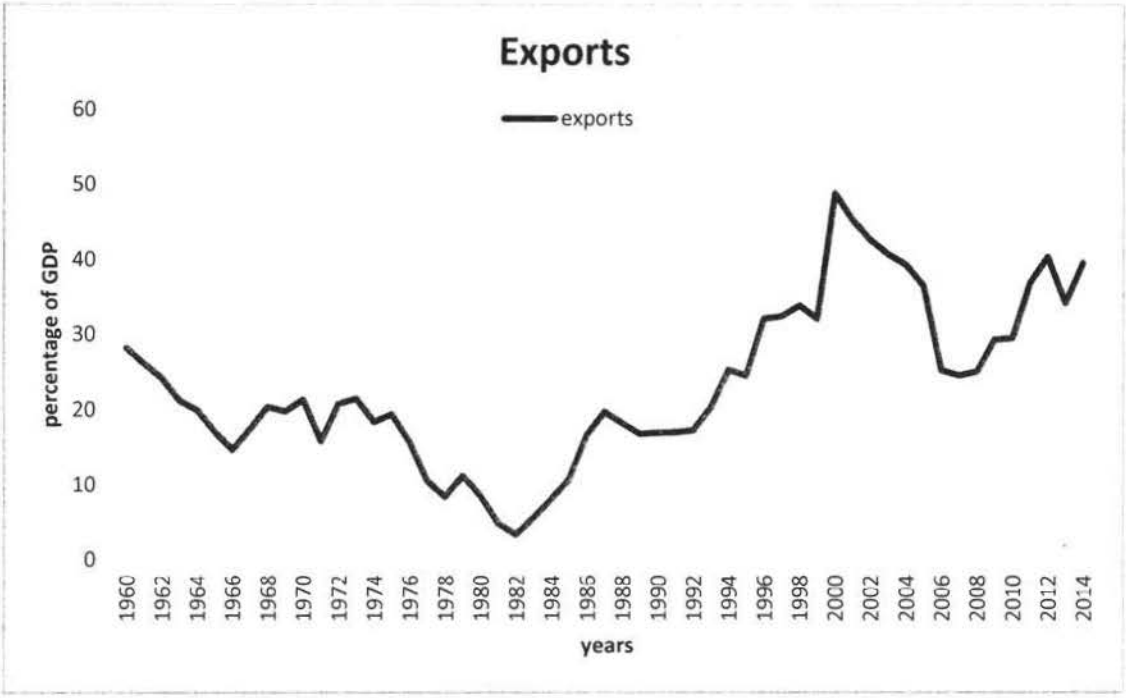
amidst economic policies adopted by governments that neither planned their actions nor foresaw the consequences of their actions.

Figure 1: Overview of Ghana's Imports



The visual presentation from the graph tells the story of Ghana's imports of goods and services as a percentage of GDP. The past three decades indicate that Ghana's imports as a percentage of the GDP has increased and still increasing in the present. We also notice a decline from the 1960s down to the 1980s. This is because, the country's terms of trade eroded which indicated that the country needed a greater amount of exports relative to the amount of goods imported. As a result, it led to the smuggling of goods from neighboring countries and creation of black market. In addition, these were periods whereby the government formulated various strategies such as import substitution industrialization in order to reduce the country's imports to encourage locally produced goods and services (Harvey & Sedegah, 2011).

Figure 2: Overview of Ghana's Exports



The terms of trade erosion as stated in the import section also affected the country's exports (i.e. fluctuations on the graph). This is because most of the enterprises that produced exported goods could not import some of the materials they needed since imports had been reduced. Nevertheless, this did not last for long. Right after the millennium (i.e. year 2000), Ghana's exports experienced a fall until 2006. From 2006 until now, exports have been increasing due to some noteworthy developments or export promotion strategies (such as the National Export Strategy) in the exports sector over these years in the country (Osei-Assibey, 2015). However, this increase is at a slow pace.

2.5 Ghana's Trading Partners

According to the Organization for Economic Co-operation and Development, Ghana is the 92nd largest export economy in the world and the 122nd most complex economy. The top export destinations of Ghana are Switzerland, China, France, India, and the Netherlands. The top import origins are China, United States of America, the Netherlands, Nigeria and India. Ghana's imports are mainly from Europe and America, with European imports constituting as much as 62.6% in the 1950s, decreasing gradually to about 35% in the 2000s. While imports from Europe decreased over the years, they increased from Asia and the rest of Africa. Imports from Asia increased to over 20% in the 2000s from about 5% in the 1960s to about 22% in the 2000s (Harvey, 2011).

China: China has become the largest supplier of imports to Ghana. According to the Ghana National Authority (GNA) report citing statistics from the Ministry of Trade, China has supplied 18.3% of Ghana's imports worth $2 billion in 2013. The goods imported from China include food, live animals, tobacco, chemical products, machinery, transport and textiles. However, Ghana's exports to China are dominated by traditional or primary exports such as unprocessed cocoa, wood products and petroleum oils.

United States of America: The United States is among Ghana's principal trading partners, with two-way trade between the two countries reaching $1.45 billion in 2014. A number of major U.S companies operate in the country, including IBM, Coca-Cola and Newmont Mining. The bilateral trade by sector between the two countries includes agricultural products (especially

rice), forest products, chemical-related products, energy-related products, textiles and apparel, minerals and metals, machinery, transportation equipment, and electronic products.

The Netherlands: The Netherlands and Ghana have maintained diplomatic relations since 1701. Ghana is one of the Netherland's principal trading partners in Sub-Saharan Africa, and one of its 15 development cooperation partner countries. The Netherlands is one of Ghana's main export countries, particularly for cocoa. The main goods imported from the Netherlands include capital goods, petroleum and foodstuffs. (Government of the Netherlands)

India: India is among one of the largest foreign investors in the Ghanaian economy as well as one of the largest exporters to the Ghanaian economy. Ghana's main exports to India are gold, cocoa, nut, timber products, pearls and precious stones. India's major exports to Ghana include pharmaceuticals, agricultural machinery, transport vehicles, electrical equipment, plastics, iron and steel, ethyl alcohol, beverages and spirits, cereals, made-up textiles among others. (High Commission of India)

Switzerland: Ghana is Switzerland's most important supplier of cocoa and its second most important supplier of pineapple. Swiss exports to Ghana consist largely of machinery, in particular food processing and pharmaceutical products. (Federal Department of Foreign Affairs)

France: Ghana is the fifth largest supplier in Sub-Saharan Africa for France. Ghana mainly supplies crude oil to France, and also agricultural products and food. France exports mainly metallurgical products, refined petroleum products, food products and engineering equipment to Ghana. (Embassy of France, Accra)

Table 2: Ghana's Trading Partners

	2011	2012	2013	2014	2015
China	16.60	17.25	17.49	16.46	19.84
United States	10.52	11.23	9.80	8.65	9.60
Belgium	6.52	6.65	7.04	5.14	6.12
Canada	2.04	1.65	2.04	3.11	5.14
India	4.66	4.27	4.67	5.33	5.05
United Kingdom	4.89	5.23	4.16	3.70	4.32
Israel	0.25	0.19	0.21	0.21	3.61
Turkey	1.39	1.50	1.25	3.10	3.35
South Africa	3.21	3.50	3.18	2.91	3.21
Germany	2.91	3.48	3.71	3.32	2.59
United Arab Emirates	2.47	2.59	2.51	5.10	2.14
Spain	1.56	1.90	1.85	1.41	2.14
Vietnam	0.95	1.00	1.69	1.39	2.11
Italy	2.22	2.08	2.72	2.43	2.05
Korea	2.71	2.30	3.43	1.85	1.90
Thailand	2.70	1.78	2.03	2.38	1.74
Greece	0.08	0.18	0.13	3.70	1.69
Nigeria	7.60	4.18	4.03	1.02	1.67
Netherlands	3.35	2.98	2.58	2.12	1.65
France	2.17	1.72	1.98	5.16	1.37
Togo	1.12	1.03	2.19	1.31	1.30
Japan	1.46	1.95	1.36	1.40	1.22
Brazil	2.27	1.57	2.01	2.08	1.20
Sweden	1.99	1.44	1.26	0.71	0.95
Indonesia	0.85	0.94	1.34	1.08	0.87
Australia	1.29	1.52	1.27	0.61	0.83
Pakistan	0.08	0.05	0.07	0.11	0.80
Hong Kong	0.63	0.79	0.56	0.79	0.77
Malaysia	0.94	0.89	0.78	0.69	0.71
Saudi Arabia	0.60	0.53	0.82	0.61	0.61
Egypt	0.60	0.59	0.58	0.40	0.54
Mauritania	0.77	0.53	0.47	1.04	0.45
Russia	0.41	0.35	0.55	0.41	0.45
Singapore	0.43	0.47	0.59	0.74	0.42
Ireland	0.41	0.49	0.56	0.36	0.41
Cote D'Ivoire	0.56	1.15	0.70	0.65	0.35
Norway	0.42	0.31	0.36	0.28	0.34
Finland	0.26	0.25	0.18	0.11	0.32
Ukraine	1.04	1.05	0.58	0.43	0.32

Angola	0.08	3.43	0.01	0.19	0.28
Lebanon	0.29	0.34	0.29	1.72	0.27
Other countries	4.71	4.69	6.94	5.79	5.28
	100	**100**	**100**	**100**	**100**

Table 3: Exports to Major Trading Partners

	2011	**2012**	**2013**	**2014**	**2015**
India	3.98	1.51	3.66	4.10	17.99
Switzerland	4.77	7.69	9.20	8.13	10.65
China	1.42	3.98	3.59	5.98	9.03
New Zealand	0.01	0.01	0.01	0.03	6.58
Netherlands	3.92	4.81	5.95	4.44	6.37
France	9.49	8.94	7.39	6.16	5.32
Italy	5.74	7.78	8.62	5.33	5.30
South Africa	17.34	28.76	22.24	18.45	4.80
Mali	0.12	0.37	0.40	0.52	3.18
Portugal	0.02	0.02	1.01	1.14	3.14
United Arab Emirates	5.48	10.37	13.03	8.16	2.67
Belgium	2.22	0.83	0.98	1.42	2.60
Burkina-Faso	2.76	2.35	3.66	3.98	2.48
United States	2.45	1.88	2.56	1.91	2.11
Malaysia	0.77	1.73	0.91	2.48	1.95
Vietnam	0.14	0.10	0.33	0.48	1.60
Nigeria	1.09	1.58	1.11	1.20	1.30
Togo	24.22	5.57	0.59	0.68	1.22
United Kingdom	1.96	1.56	2.19	2.48	1.22
Benin	0.48	0.61	1.54	1.51	1.05
Japan	0.36	0.57	0.62	0.67	0.92
Turkey	0.94	1.45	0.75	0.82	0.89
Spain	0.73	1.70	1.63	2.43	0.87
Lebanon	0.04	0.10	0.23	0.64	0.79
Nigeria	0.09	0.10	0.61	0.41	0.65
Estonia	0.67	0.51	0.40	0.56	0.61
Germany	0.94	1.25	0.92	1.44	0.50
Hong Kong	0.01	0.02	0.21	0.28	0.38
Ukraine	0.31	0.10	0.29	0.39	0.37
Cote D'Ivoire	2.68	0.52	0.46	0.53	0.36

Israel	0.05	0.02	0.03	0.02	0.36
Singapore	0.22	0.07	0.23	0.38	0.32
Others	4.58	3.14	4.63	12.88	2.43
	100	**100**	**100**	**100**	**100**

Table 4: IMPORTS from ECOWAS

	2011	2012	2013	2014	2015
Burkina Faso	1.23	1.76	1.23	1.74	1.83
Cape Verde	0.07	0.23	0.16	0.11	0.00
Benin	0.27	0.31	0.51	1.31	0.53
Gambia	0.01	0.02	0.01	0.08	0.02
Guinea	0.17	0.44	1.70	1.09	0.10
Cote D'Ivoire	5.66	16.18	8.96	19.15	9.13
Liberia	0.07	0.96	0.65	1.17	0.52
Mali	0.26	0.41	0.20	0.36	1.50
Niger	1.07	0.86	0.67	1.76	1.67
Nigeria	77.29	58.91	51.42	30.31	43.36
Guinea Bissau	0.00	0.02	4.95	2.39	2.84
Senegal	2.38	4.31	1.04	0.77	2.32
Sierra Leone	0.17	1.06	0.60	0.99	2.32
Togo	11.36	14.53	27.93	38.76	33.87
	100	**100**	**100**	**100**	**100**

Source: Ghana Statistical Service

Table 4: EXPORTS to ECOWAS

	2011	2012	2013	2014	2015
Burkina Faso	8.47	20.53	41.73	40.46	23.33
Cape Verde	0.01	0.02	0.02	0.00	0.00
Benin	1.48	5.33	17.50	15.32	9.88
Gambia	0.09	0.18	0.26	1.00	0.12
Guinea	0.30	0.53	0.62	0.57	0.68
Cote D'Ivoire	8.23	4.57	5.26	5.37	3.40
Liberia	2.38	0.67	1.30	6.91	0.48
Mali	0.37	3.23	4.61	5.23	29.93
Niger	0.29	0.91	6.93	4.14	6.15
Nigeria	3.33	13.77	12.62	12.19	12.18
Guinea Bissau	0.00	0.02	0.01	0.02	0.02
Senegal	0.28	0.77	1.27	1.27	2.04

Sierra Leone	0.37	0.79	1.13	0.63	0.37
Togo	74.40	48.68	6.76	6.90	11.44
	100	**100**	**100**	**100**	**100**

Source: Ghana Statistical Service

2.6 Empirical Review

Due to the importance of international trade to the world, various studies done have been surveyed. The aim is to serve as a guide in my research most especially, the selection of variables in my modeling.

Imperfect Substitution

The imperfect substitution model assumes that the imported goods and services are not substances with domestic goods and services. Chani, Pervaiz, & Chaudhary (2011) used imperfect substitution approach to derive the aggregate import demand function based on disaggregated expenditure components. They argued that consumption expenditure is the major determinant of import demand in Pakistan. Yue (2010) who found import demand for Cote d'Ivoire to be mainly determined by their consumption activities and exports supported this result. However, recent study by Nassr (2013) showed that gross domestic product and consumer price index affected the import demand in Palestine. All of these studies also performed various econometric tests such as augmented Dickey-Fuller test, Johansen co-integration test and the error correction model (i.e. estimating the dynamic short-run relationship between the dependent variable and the independent variables) in order to check the authenticity of the individual variables in the data. This, we find to be of significance since they will serve as a standard for the application to Ghana.

Bounds Test

Tang & Nair (2002) re-evaluated the import demand function for Malaysia by adopting the Perasan et al. (2000) bounds test and found a co-integration existence among imports, income and relative prices. Hence, their results indicated that import volume is sensitive to increase in domestic price whereas Narayan and Smyth (2005) found that aggregate import is inelastic with respect to income in Brunei Darussalam. On the contrary, Chen (2008) argued that volume of aggregate imports is only responsive and elastic to real income and not to relative prices. On levels of relationships among the variables, both Tang & Nair (2002) and Chen (2008) prove the existence of a long-run relationship between import demand and its determinants.

Traditional Import Function

Gafar (1988) adopted the traditional import function in economic theory in modeling their data. The variables used included import demand, domestic price level and an income variable. Their empirical results supported the view that relative prices and real income are the important factors influencing the demand for imports. Correspondingly, Oteng-Abayie & Appiah-Nkrumah (2009) adopted the traditional import demand function in examining the key variables that are important in estimating an import demand function for the economy of Ghana. The used a time series data from 1970 to 2002 on variables such as real exchange rate, value of merchandise imports, real GDP and relative import prices. Just like the results of Gafar (1988) showing that real income is one of the major determinants of import demand, the results for Oteng-Abayie & Appiah-Nkrumah (2009) similarly suggested that real GDP is the main factor influencing imports in Ghana. The results also indicated that economic growth and the depreciation of the local currency could stimulate increased demand for merchandise imports.

Employing the traditional import demand model, Fatukasi & Awomuse (2012) assessed the determinants of demand function for import in Nigeria. In their methodology, the researchers used a time series data covering the period of 1970 to 2008. The variables used included total exports, total imports, international trade or total trade, balance of payment, real GDP, Nigeria's external reserve, official foreign exchange rate and ratio of openness. The study found an inelastic and positive relationship between import demand and real GDP, real exchange rate and index of openness but with inelastic and negative relationship existing between import demand and external reserve in Nigeria. This study included majority of the various diagnostic tests such as checking for the stationarity of the variables by conducting the unit root test as well as the Johansen co-integration test, and using the error correction model (ECM). The tests applied will help in the advancement or development of the paper thus, will be deployed for the analysis on Ghana. The only difference between this study and that of the other two (i.e. Gafar (1988)) and Oteng-Abayie & Appiah-Nkrumah, (2009)) studies is the fact that Fatukasi & Awomuse (2012) expanded the variables they used in their analysis.

Consumer Demand Theory

Harvey & Sedegah (2011) analyzed the structure of, and modeled demand for imports in Ghana using a time series data from 1967 to 2004. The model they adopted was based on consumer demand theory in the context of imports for a country. An error correction model and co-integration were used to estimate parsimonious models for aggregate imports and three other categories. The results indicated that domestic income, foreign exchange reserves and trade liberalization all play significant roles in both the short-run and the long-run import demand levels in Ghana.

Others

A recent study on Ghana by Osei (2012) examined the relationship between import demand and economic growth. Upon the analysis, his results suggest that import trade contributes to economic growth as evidenced by increased imports of intermediate and capital goods. He also employed certain econometrics tests just like Fatukasi & Awomuse, (2012) in the case of Ghana. This study only used data from 1991 to 2011, whereas our study will add up to the literature since the period will be 1960 to 2014.

Eager to find whether there exist a long-run relationship between import demand and its determinants in the UK, Abbott & Seddighi (1996) applied the Johansen co-integration test in their analysis and found similar results as Chani, Pervaiz, & Chaudhary (2011) who postulated that consumption expenditure is the major determinant of import demand. In a similar line, Dutta & Ahmed (1999) also investigated the existence of a long run aggregate merchandise import demand function for Bangladesh during the period 1974-94 and found that real import prices and real GDP were the important determinants of import demand. Not so far off from each other, Malhotra (2011) estimated the import demand functions for India's total imports and for some of its major categories. Upon the results, total imports were found to be income elastic as well as price elastic. Comparing this result to that of Narayan and Smyth (2005), we realize a contrasting result. Butts & Mitchell (2012) examined the relationship between import demand and a set of foreign exchange supply channel variables using annual time series data for Guyana over the period of forty years. They defined the channel variables as convenient set of explanatory external-linkage variables inclusive of official foreign aid, exports/imports, exchange rate and foreign exchange reserves. The findings indicated the presence of a long-run relationship between import demand and the foreign exchange supply channels variables.

According to the authors, the most important findings of the paper is the fact that import demand is impacted by the availability of foreign exchange in Guyana.

Empirical studies on Ghana on this topic are difficult to find in the current literature. This is due to the limited work that has been done on Ghana on the determinants of import demand. Again, in the few studies that have been conducted, the time span of the studies have largely been short, typically spanning thirty-two years at most. Most of the studies for Ghana are based on the traditional import demand models and consumer demand theory.

For example, Oteng-Abayie & Appiah-Nkrumah (2009) estimated the determinants of import demand in Ghana using the traditional import demand model in their analysis. Their results indicated real income (GDP) as the main determinant of Ghana's import demand with economic growth and appreciation of the local currency could serve as a stimulus to increased demand for merchandised imports. Similarly, Harvey & Sedegah (2011) also estimated the import demand function of Ghana and found that domestic income, foreign exchange reserves and trade liberalization are the major determinants of Ghana's import demand.

Therefore, this study seeks to fill these gaps in the literature by extending the length of the period under consideration for Ghana and by employing (Yue, 2010) imperfect substitution model, for the first time in the literature.

CHAPTER THREE

3.0 METHODOLOGY

This section considers the model used in estimating the import demand function for Ghana for the period 1960 to 2014.

3.1 The Imperfect Substitute Model

It can be seen from the literature of quite a number of approaches were used in estimating import demand. However, this study employs the imperfect substitute model by (Yue, 2010). The imperfect substitute model assumes that neither imports nor exports are perfect substitutes for the domestic goods of the country under consideration (Yue, 2010).

$$\textbf{Import} = \beta_0 + \beta_1 \textbf{Exports} + \beta_2 \textbf{Capital formation} + \beta_3 \textbf{GDPPC} + \beta_4 \textbf{Government Spending} + \beta_5 \textbf{Exchange Rate} + \mu \quad (1)$$

3.2 Data

We collected time series data from World Development Indicators of the World Bank for the period from 1960 to 2014. In this study, the variables of interest are imports of goods and services, exports of goods and services, capital formation, gross domestic product per capita, household consumption, reserves, government consumption and trade balance. The dependent variable is the imports of goods and services while the rest of the variables are the explanatory variables. Estimation procedures utilized STATA. In addition, we collected data for the graphical analysis from the United Nations Commodity and Trade Statistics (UN COMTRADE).

3.3 Measurement of Variables

Imports

This represents the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, and license fees and other services such as financial, information, business, personal and government services. They exclude compensation of employees and transfer payments. The measurement is as a percentage of GDP.

Exports

The measurement of this variable is as a percentage of GDP and the source is from the World Bank database. It represents the value of all goods and services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees and other services such as financial, information, business and government services.

Capital Formation

The measurement of this variable is as a percentage of GDP and it is from the World Bank database. It consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements, plant, machinery and equipment purchases and the construction of railway, roads, schools, offices, hospitals, private residential dwellings and commercial and industrial buildings. Inventories are stock of goods held by firms to meet temporary or unexpected fluctuations in production or sales and work in progress.

GDP per capita

The measurement of this variable is in constant 2010 US dollars and the source obtained from is the World Bank database. It is the gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation-fabricated assets or for depletion and degradation of natural resources.

Government Spending

The measurement of this variable is as a percentage of GDP and it is obtained from the World Bank database. It includes all government current expenditures for purchases of goods and services. It also includes most expenditure on national defense and security but excludes government military expenditures that are part of government capital formation.

Exchange Rate

The measurement of this variable is in terms of the local currency units (i.e. the Ghanaian Cedis) relative to the US dollar (i.e. cedi/US$) and it is from the World Bank database. It refers to the exchange rate determined by national authorities, and it is calculated as an annual average based on monthly averages.

3.4 Hypotheses

Hypothesis 1: The influence of exports on import demand will be positive and significant. Imports and exports in international trade can move either in the same or opposite direction. In that, an increase in exports generates foreign exchange that forwards imports. Hence, we will expect that a rise in export will lead to a rise in import.

Hypothesis 2: The influence of capital formation, which serves as a proxy for investment, will have a positive and significant impact on import demand. This is because capital investment is the spending of saved money on capital goods, and capital goods include assets such as machines, equipment, computers, tools, vehicles among others. The reality is that the Ghana government can only have access to these goods by importing them from other countries or the investors themselves importing from their country of origin into Ghana. Hence, an increase in the demand for imports.

Hypothesis 3: The influence of GDP per capita on import demand will be positive and significant as well. From IS-LM model, we know that an increase in country's income will cause the import demand of that country to rise due to more income in the economy. Hence, we expect a positive and significant impact of real GDP on import demand in our results.

Hypothesis 4: The influence of government consumption on import demand will be positive and significant. When the government releases funds for consumption, we expect that it uses the funds for construction of roads, hospitals and other infrastructural work. For a country like Ghana, the government imports human capital such as contractors from elsewhere. In addition, government spending boost aggregate demand in the sense that, the government literally puts money in the pockets of workers and suppliers as wages or salaries, who go on to spend the

money on goods and services (including both domestic and imported ones). Therefore, we expect that an increase in government consumption will lead to an increase in import demand.

Hypothesis 5: The influence of exchange rate on import demand will be negative and significant. This result will be expected because the Ghanaian cedi has been depreciating over the years now and this makes foreign goods become more expensive in domestic currency terms. Thus, consumers will substitute for less expensive goods decreasing the amount of imports in the domestic country.

3.5 Graphical Analysis

The initial thought was to estimate the determinants of import demand using the various sectors of imports in Ghana. However, deficiency in the number of years did not permit that to happen. We then decided to estimate the various sectors of imports with the limited number of years available (i.e. from 1996 to 2013). The selected sectors of imports include rice, iron and steel, plastics and articles, machinery and mechanical appliances and motor vehicle parts.

3.6 Econometric Methodology

Time series data is mainly useful for forecasting future values, accessing the impact of a single event and helps in studying causal patterns. However, it has limitations such as the presence of unit roots, presence of serial correlation, collinearity problems among others.

In relation to the limitations listed above, we employed the pairwise correlation matrix to detect whether collinearity problems existed among the explanatory variables. Also, to avoid the

presence of heteroscedasticity, the Breusch-Pagan test was deployed to check whether the variance of the disturbance term is constant or not. Serial correlation was also checked for by conducting the Durbin-Watson test. Again, to find out if long run relationship exists among the variables, we performed the Johansen Cointegration test. As per one of the research objectives, the granger-causality test was deployed to verify the presence of causal relationship between the dependent variable and the independent variables.

Furthermore, spurious regression occurs when one uses non-stationary time series data to estimate relationships among variables. To avoid this, we employed the Augmented Dickey-Fuller (ADF) test to determine if there is a unit root in each series. We reject the unit root hypothesis if the estimated DF statistic is less than the critical value tabulated for the five percent significant level. The procedure for the test is as follows:

$$y_t = \rho y_{t-1} + \mu_t \qquad (2)$$

where y_t is the variable of interest, t is the time index, ρ is a coefficient, and μ_t is the error term. A unit root is present if $\rho = 1$. The model would be non-stationary in this case. We write the regression model as:

$$\Delta y_t = (\rho-1)\, y_{t-1} + \mu_t = \delta\, y_{t-1} + \mu_t \qquad (3)$$

where Δ is the first difference operator. This model can be estimated and testing for a unit root is equivalent to testing $\delta = 0$ (where $\delta \equiv \rho-1$). Since the test is done over the residual term rather than raw data, it is not possible to use standard t-distribution to provide critical values. The test consists of three main versions:

Test for a unit root:

$$\Delta y_t = \delta y_{t-1} + \mu_t \qquad (4)$$

Test for a unit root with drift:

$$\Delta y_t = \alpha_0 + \delta y_{t-1} + \mu_t \qquad (5)$$

Test for a unit root with drift and a deterministic time trend:

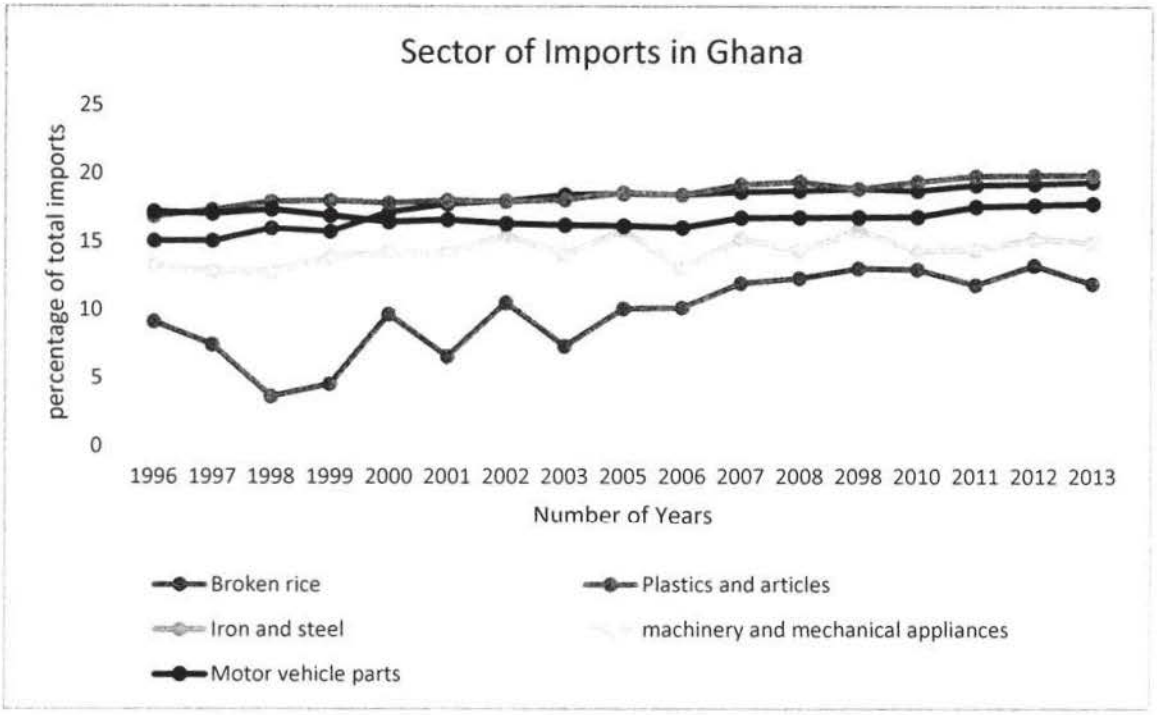
$$\Delta y_t = \alpha_0 + \alpha_1 t + \delta y_{t-1} + \mu_t \quad (6)$$

.

CHAPTER FOUR

4.0 DATA ANALYSIS

Figure 3: Graphical Representation of Ghana's Imports



As mentioned in chapter two, Ghana trades with quite a large amount of countries globally with majority of the countries in Europe and Asia. In this analysis, we selected a few from the many goods that the Ghanaian economy imports in order to know the trend and the progress of importation. The goods selected include plastics, broken rice, machinery and appliances, iron and steel and motor vehicle parts for the period 1996 to 2013. The aforementioned items were selected because according to the UNCOMTRADE, these are the most imported items by the Ghanaian economy. This short period was due to the lack of data for the previous years.

From the graph, we can see a lot of variations and movements going on for some of the goods while we see the opposite for others. According to the literature, Ghana imports plastics from India, and this in the late nineties fell to less than 5% of the total imports. However, the demand increased after 1998 but still fluctuated between 1999 and 2003. Since then, the demand for plastic has exhibited a constant increase with the peak in 2010 constituting over 10% of the total imports. This is mainly associated with the fat that the local industry faces high taxes that tend to motivate the importation of finished plastics from other countries, as the prices of the locally produced ones are higher in relation to the imported ones.

Machinery and mechanical appliances from the literature are imported from China, the United States, Switzerland and India. The demand for these goods started in the nineties on a steady increase with series of fluctuations in the between 2001 and 2010. The demand for machinery and mechanical appliances recorded its peak in 2009 constituting 15.3% and its trough in 2006 constituting 10.5%.

Ghana's importation of motor vehicle parts is mainly from China, India and the United States. Looking at the graph, this good does not display many movements like that of machinery and plastics. It started as 15.5% of the total imports in 1996 with a slight decline from 2000 to 2006. The demand for motor vehicles increased slightly in 2007 that has taken a stable pattern. The good recorded a peak of 15.5% and a trough of 15.2% of the total imports.

Rice is mainly imported from the United States by the Ghanaian economy. The demand for rice did not also display any form of variation. Ghana's import demand for rice has been on a steady increase from the late nineties to 2013. This good constitutes about 19% of the total imports.

India is the main exporter of iron and steel to the Ghanaian economy. In a similar line to that of rice, iron and steel do not vary. In 2005 and 2006, this good recorded the same percentage as rice (i.e. 17%). The sector has experienced an increase since then to about 20% of total imports.

From the graphical analysis, we can deduce that the sector with the highest percentage contributing to the total imports of Ghana is the iron and steel and the sector of imports that is least demanded by the Ghanaian economy is plastics and articles.

Table 5: Descriptive Statistics (1960-2014)

Variable	*Obs.(years)*	*Mean*	*Std. Deviation*	*Minimum*	*Maximum*
LIMPORTS	55	3.26	0.67	1.09	4.21
LEXPORTS	55	3.01	0.57	1.21	3.89
LGOV'T SPENDING	55	2.45	0.23	1.77	3.04
LINVESTMENT	55	2.68	0.56	1.22	3.46
LRGDP	55	6.90	0.19	6.55	7.42
EXCHANGE RATE	55	0.32	0.53	0.00	1.95

The table 3 below shows a correlation matrix for the independent variables. The significance of this matrix is to detect any hint of perfect collinearity. From the results, we can observe that the variables are fairly highly correlated. We can say that investment and exports are exhibit collinearity due to the high correlation coefficient of 0.87 however, we still included them in our model because they did not affect it in any way.

Table 6: Pairwise Correlation Matrix

	LEXPORTS	LRGDP	LINVESTMENT	LEXCHANGE RATE	LGOV'T SPENDING
LEXPORTS	1.00				
LRGDP	0.56	1.00			
LINVESTMENT	0.87	0.63	1.00		
LGOV'T SPENDING	0.39	0.72	0.48	1.00	
LEXCHANGE RATE	0.65	0.80	0.69	0.45	1.00

4.1 UNIT ROOT TEST RESULTS

The study looks at the unit root properties of the data using the Augmented Dickey-Fuller test. Table 3 shows the level of the variables and Table 4 shows their first differences for test. We used the Augmented Dickey-Fuller unit root test to check the stationarity of time series data. According to the results, imports, exports, real gross domestic product, government spending, exchange rate and capital investment are not stationary at level. This implies the null hypothesis of unit root at level cannot be rejected for all the variables. However, all the variables are stationary at the first difference. This indicates that we reject the null hypothesis of unit root. Hence, all the variables are stationary at first difference and have the same order of integration, which is I (1).

Table 7: DICKEY-FULLER TEST AT LEVEL OF VARIABLES

	DF STATISTIC	CRITICAL VALUE
IMPORTS	-2.002	-3.496
EXPORTS	-1.621	-3.496
RGDP	1.464	-3.496
GOV'T SPENDING	-2.119	-3.496
EXCHANGE RATE	2.178	-3.496
CAPITAL INVEST.	-2.477	-3.496

Table 8: DICKEY-FULLER TEST AT FIRST DIFFERENCE

	DF STATISTIC	CRITICAL VALUE
IMPORTS	-5.565	-3.497
EXPORTS	-5.075	-3.497
RGDP	-5.443	-3.497
GOV'T SPENDING	-6.336	-3.497
EXCHANGE RATE	-5.566	-3.497
CAPITAL INVESTMENT	-7.656	-3.497

Table 9: JOHANSEN CO-INTEGRATION TEST

Rank	Eigenvalue	Trace statistic	5% critical value
0		**106.4148**	**104.94**
1	**0.48805**	**70.9302***	**77.74**
2	**0.39728**	**44.0957**	**54.64**
3	**0.28006**	**26.6809**	**34.55**
4	**0.26637**	**10.2639**	**18.17**
5	**0.15628**	**1.2573**	**3.74**
6	**0.02344**		

We applied the Johansen co-integration test to examine the co-integration among the variables of import demand, exports, real gross domestic product, government spending, capital formation and exchange rate. Before the application of the test, we used the AIC criterion to rank the lag length, which is a lag of 1 (results of the lag length can be found in the appendix). In addition, we used trace statistics to check the number of co-integration against the alternative of co-integration, starting with the null hypothesis of no co-integration ($r \leq 0$) among the variables. The trace test statistics is 106.4148, which is above the critical value of 104.94 at 5% significant level. Hence, it rejects the null hypothesis $r \leq 0$ in favor of alternative hypothesis $r = 1$. However, the null hypothesis of $r \leq 1$ cannot be rejected in favor of alternative hypothesis of $r = 2$ because of the trace statistics 44.0957 which less than the critical value of 54.64 at 5% significant level. This runs through for the rest of the ranks. Thus, the analysis of data confirms the presence of long run relationship among import demand, exports, real domestic product, government spending, capital formation and exchange rate in Ghana.

4.2 GRANGER CAUSALITY TEST

Model 1:

$Imp_t = \beta_1 Imp_{t-1} + \beta_2 Imp_{t-2} + \beta_3 Imp_{t-3} + \beta_4 Imp_{t-4} + \varepsilon_t$

Model 2:

$Imp_t = \beta_1 Imp_{t-1} + \beta_2 Imp_{t-2} + \beta_3 Imp_{t-3} + \beta_4 Imp_{t-4} + \delta_1 Exp_{t-1} + \delta_2 Exp_{t-2} + \delta_3 Exp_{t-3} + \delta_4 Exp_{t-4} + \varepsilon_t$

Model 3:

$Exp_t = \delta_1 Exp_{t-1} + \delta_2 Exp_{t-2} + \delta_3 Exp_{t-3} + \delta_4 Exp_{t-4} + \varepsilon_t$

Model 4:

$Exp_t = \delta_1 Exp_{t-1} + \delta_2 Exp_{t-2} + \delta_3 Exp_{t-3} + \delta_4 Exp_{t-4} + \beta_1 Imp_{t-1} + \beta_2 Imp_{t-2} + \beta_3 Imp_{t-3} + \beta_4 Imp_{t-4} + \varepsilon_t$

HYPOTHESIS:

H_0: $\delta_1 = \delta_2 = \delta_3 = \delta_4 = 0$

H_1: At least one $\delta \neq 0$

$F = \dfrac{(SSU - SSR)/4}{SSR/(n-k-1)}$ where, *SSU* means the sum of squares error of the unrestricted model, *SSR* is the sum of squares error of the restricted model, *n* is the number of observations and *k* is the number of restricted variables.

The variables used were all at first difference. This is because Granger causality cannot be conducted when variables are non-stationary. Following the equation above, the F calculated for the first and second models was 3.468 whereas F critical was 2.56. Since the F calculated is greater than the F critical, we rejected the null hypothesis and concluded that exports granger-causes imports. However, in the case of the third and fourth models, the F calculated was less than the F critical indicating that we cannot accept the null hypothesis. Hence, we concluded that imports do not granger-cause exports in Ghana.

Table 10: Results at First difference

Imports	Coefficient	Test statistic
Exports	**0.739*** **	**8.36**
	(0.088)	
GDP per capita	**0.001*** **	**2.68**
	(0.0004)	
Capital Investment	**0.325*** **	**4.19**
	(0.078)	
Government Spending	**0.082**	**0.63**
	(0.131)	
Exchange Rate	**-0.644*** **	**-2.65**
	(0.243)	
Constant	**0.030**	**1.49**

	(0.020)
F- statistic	**35.68*** **
R^2	**0.79**
Adjusted R^2	**0.77**
Durbin h test	**Prob=0.1330**
Heteroscedasticity	**0.3027**
Skewness	**-0.1**
Kurtosis	**2.9**
Jarque-Berra	**0.11**
Observation	**55**

The significant F-statistic tells us that overall, the independent variables jointly explain the dependent variable. The R^2 indicates that 79% of the total variation in the dependent variable is explained by the independent variables. To check for autocorrelation, the Durbin h test was conducted since the dependent variable was lagged. The result showed a probability of 0.1330 which implies that there is no serial correlation among the error terms. The probability value (i.e. 0.3027) obtained from the heteroscedasticity test also shows that all the error terms have equal variance. In order to check whether the residuals are normally distributed, the Jarque-Berra was calculated using the skewness and kurtosis. The JB statistic of 0.11 indicates that all the residuals are normally distributed.

From the results, the a priori expectations were not all met. All the variables with the exception of exchange rate were expected to positively and significantly affect import demand. All other things being equal, an increase in exports by one percentage point will lead to an approximately

0.74% increase in import demand, on average. This variable exhibited a positive and significant impact on import demand that supports the research hypothesis that exports have a positive and significant relationship on import demand. This shows an inelastic relationship with import demand. This is consistent with (Yue, 2010) analysis for Cote d' Ivoire and since both countries are found in the same region, it is not a surprise to see the positive impact of exports on import demand. Intuitively, exports and imports help grow national economies and expand the global market. Every country is endowed with certain advantages in resources and skills. For example, Ghana is endowed with natural resources as such cocoa, gold, timber, oil among others whereas its major trading partners like China have highly developed infrastructures, technological innovations, good educational systems among others. As the level of exports of a country increases, it means that there will be a rise in production. This increase in production will also mean that these exporting companies will need access to important resources and products that are not available domestically hence, it is vital to import. This positive impact result is also evident in the granger-causality test estimated above.

Furthermore, an increase in real gross domestic product per capita by 1% will lead to an increase in import demand by 0.001%, on average all other things being equal. The expected sign displayed by this variable supports the hypothesis that real gross domestic product has a positive and significant impact on import demand. This result indicated an income inelastic and positive relationship between import demand and real GDP which is in line with the findings of (Fatukasi & Awomuse, 2012), who found an income inelastic positive impact of real GDP on imports in the Nigerian economy. This result can be linked to the internal structure of preferences theory that postulate that if household and economic agents in a closed economy have non-homothetic consumption choices, then consumption patterns tend to exhibit variations as income grows

(Imbs and Wacziarg, 2003). In this case, an increase in real GDP or GDP per capita increases the income level of consumers. An increase in GDP per capita increases because of export increases which generates foreign exchange reserves. Because of more income in the system, consumers tend to demand more of both foreign goods and locally produced goods.

Again, an increase in capital investment by 1% will lead to approximately 0.33% increase in import demand, on average all other things being equal. This result exhibited a positive and significant relationship that suggests that there is a statistical evidence to support the assertion that capital investment exerts a positive and significant relationship on import demand. This is because investment is the value of machinery, plants and buildings that bought by firms for production purposes and it contributes to current demand of capital goods. Thus, from Aggregate Expenditure model, we know that an increase in investment will increase domestic expenditure that increases imports. Precisely, the direction of investment is mostly toward foreign machineries and goods, with an immediate increase of imports.

Furthermore, the effect of government spending showed a positive but insignificant impact on import demand. Although, the sign was positive there is no strong evidence to accept the research hypothesis of a positive relationship since the result was insignificant. Although this variable was not significant, it was consistent with the study by (Chani et al., 2011) of the determinants of import demand in Pakistan. We can attribute the positive relationship to the fact that spending is not only on domestic goods but part goes into foreign goods as well. As per Ghana being a small open economy, our knowledge on Mundell-Fleming model suggests that as government increases spending through expansionary fiscal policy, interest rate levels will increase which attracts capital flows. This appreciates the domestic currency resulting in

expensive domestic goods and cheaper foreign goods. Thus, the situation will result in an increase in demand for imports.

Finally, depreciation in the value of the exchange rate by one Ghanaian cedi will lead to a decrease in import demand by approximately 0.64 percentage points on average, all other things being equal. This variable displayed a negative and significant relationship hence; there is enough evidence to accept the research hypothesis. This result is consistent with what the theory suggests. In that, a depreciation of the exchange rate of the domestic currency is expected to decrease imports since domestic goods will be cheaper relative to foreign goods. In addition, even though Ghana's exchange rate is flexible there is still the interference of the Central Bank in regulating the exchange rate.

Table 11: Interaction Term

Imports	Coefficient	Test Statistic
Exports	**0.685*** **	**7.81**
	(0.000)	
GDP	**0.001** **	**3.44**
	(0.001)	
Govt Spending	**0.122**	**0.97**
	(0.339)	
Exchange Rate	**-0.672** **	**-2.88**
	(0.006)	
Investment	**0.311*** **	**4.19**
	(0.000)	

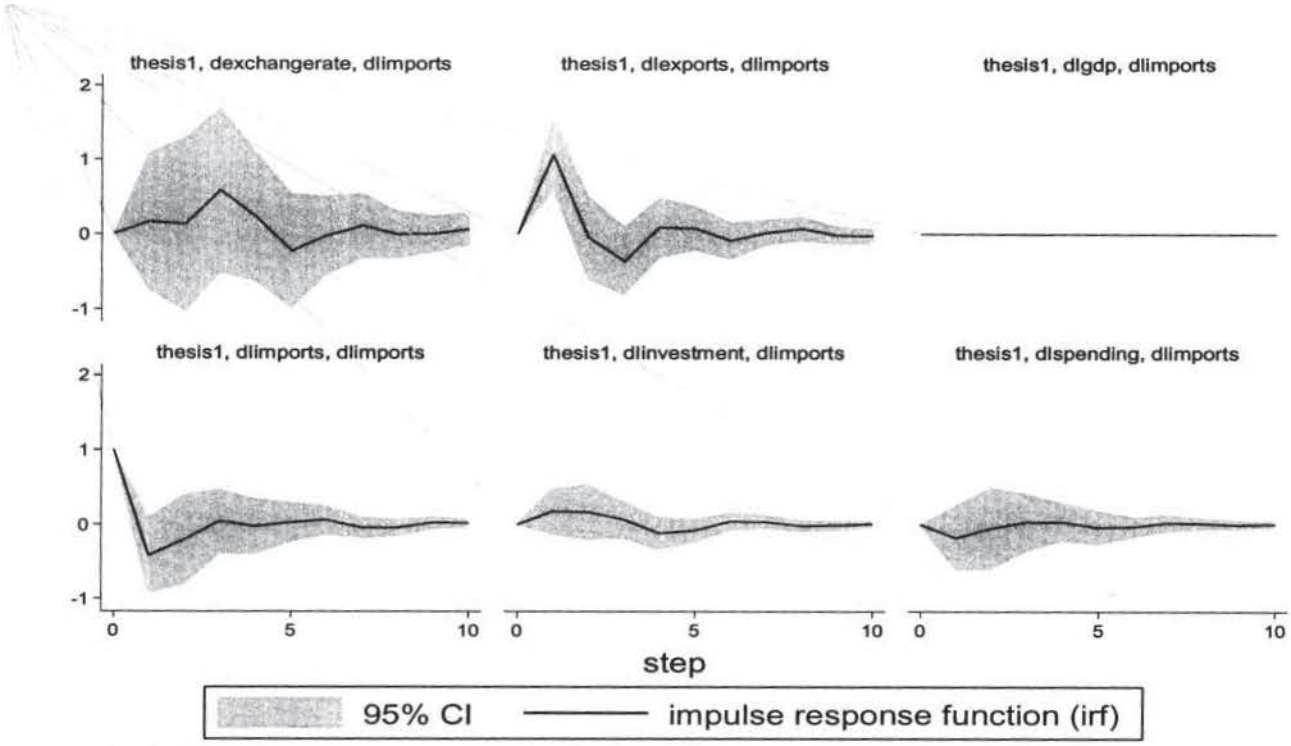
Exports_GDP	**-0.003****	**-2.32**
	(0.025)	
constant	**0.044**	**2.16**
	(0.036)	

We included an interaction term between exports and income (i.e. real GDP) to see how it will affect imports. From the table, we can observe that the effect of exports on imports depends negatively on real GDP or income. In that, a 1% increase in exports will decrease imports by 0.003% as real GDP goes up by 1% and the reverse is true, all other things being equal. Even though the coefficient of the interaction term is significant, it indicates a small marginal effect on the dependent variable, imports. Again, including the interaction term to the model did not change the signs or significance of the variables in the previous regression model. Hence, we will drop the interaction term since it does not change the results in anyway.

4.3 Impulse Response

The impulse response function generally known as the IRF measures the effect of a shock to an endogenous variable on itself or on another endogenous variable. We adopted this model in order to examine the impacts of innovations in the economy on import demand.

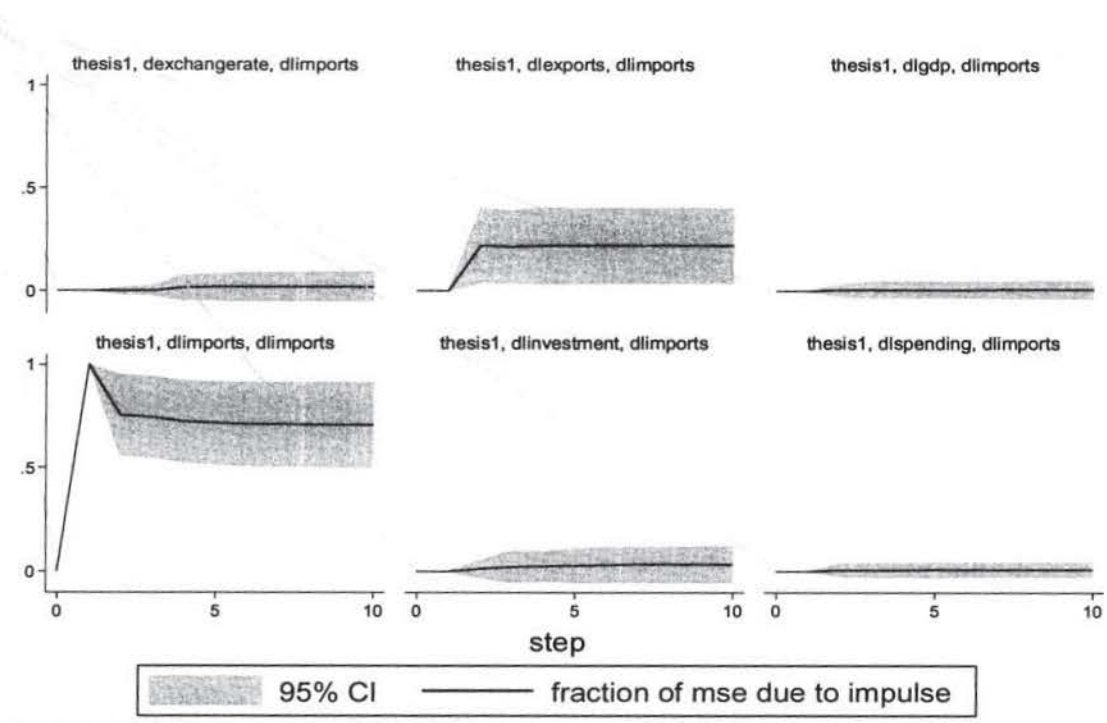
Figure 4: A Shock from imports itself and other variables to Imports



The diagram above displays following an estimation of a six-variable vector autoregressive (VAR) model, a set of six graphs each showing the response of imports innovations in one of those variables in the VAR model. The first graph shows the response of import demand when there is an innovation in exchange rates. It can be perceived that innovations in the first three periods cause a positive and increasing effect on imports but after the fifth period, imports falls and attains a negative. The long-term effect on imports due to an innovation in exchange rates remains stable. Ghana's exchange rate has undergone several innovations-from fixed exchange rate regime to flexible exchange rate regime. From 1979 to 1983, Ghana's exchange rate has been devalued under the fixed exchange rate regime with the view of improving exports in order to increase foreign reserves. Similarly, under the flexible exchange rate regime, the local currency has been depreciated a number of times with the same motive as before but to no avail. Overall, innovations in the exchange rate will mostly be towards depreciation due to balance of

payments deficits. As a result, imports will continue to fall as seen on the graph. Following the first graph is the effect on imports because of an innovation in exports. The initial effect of a shock in exports increases imports significantly in the first year (which is the short-term effect) however, it decreases from the second year and maintains a stable path among the rest of the ten-year period. In the 1980s, the Ghanaian government adopted the Economic Recovery Program (ERP) after the failure of the Structural Adjustment Program (SAP). Most of the trade policies were geared toward the promotion of exports and discouraging imports. This is quite evident on the graph as we see imports decline after a shock in exports. The third graph represents the response of imports if there is an innovation in the gross domestic product per capita. From the graph, we realize a no effect. That is, a shock to GDP per capita will not result in any changes in the import demand. Furthermore, the response of imports due to a shock in imports itself leads to a decrease in imports in the short run but a somewhat stable effect in the end. Innovations in investment also demonstrate a positive effect in the short run but remain stable for a long period. Lastly, the impact on imports because of innovations in the government spending exhibits a negative effect in the first period however, it becomes stable for the rest of the period.

Figure 5: Forecast Error Variance Decomposition



The Forecast Error Variance Decomposition (FEVD) provides a different method of depicting the system dynamics. The FEVD measures the forecast error variance of an endogenous variable that is caused by shocks to itself or to another endogenous variable in the VAR. From the figure above, exchange rate, government spending, GDP per capita and investment do not show any effect on imports.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATION

We examined the key variables that are important in determining import demand for the economy of Ghana. Time series data from 1960 to 2014 on imports, exports, real gross domestic product, government spending, capital formation and exchange rate were estimated. All the variables were stationary after first difference indicating that there is no unit root present. In order to find out whether there exists a long-run relationship among the variables, the Johansen-Co-integration test was employed. The results suggest that there exists a long-run relationship between the dependent variable and the independent variables. In addition, the results from the granger-causality indicated that there is a unidirectional causality between exports and imports. The results from the imperfect substitution model suggest that exports, real gross domestic product, capital formation and exchange rate impact imports positively and significantly. However, we found government spending to have an insignificant impact on imports. An interaction term between exports and real GDP was added to the model to see if there would be any changes. However, the results did not show any difference even though the coefficient of the interaction term was significant. Graphical analysis of the various sectors of Ghana's import demand was conducted and as per the analysis, the Ghanaian economy imports more of iron and steel and imports less of plastics and articles.

Due to the causality between exports and imports, the results show vividly that an increase in exports will also increase the demand for imports in Ghana. Now, the Ghanaian economy since the decades ago has been trying to reduce the amount of imported goods in the country, at the same time promoting exports through export-oriented programs. Nevertheless, the question is: Would not an increase in exports cause imports to also rise since there exists causality between

the two sectors in the Ghanaian economy? Based on this question and the findings achieved, eradicating imports totally to help curb the balance of payments deficit will not solve the problem. However, the main issue that must be addressed is the type of goods imported into the country. Commodity goods such as rice, cashew and millet among others should be discouraged from importation. This is because the weather conditions in Ghana (the northern part) are very favorable for the cultivation of such goods. Goods like machinery and mechanical appliances that are implemented by the exporting firms must be encouraged since at the end of the day, machines make work faster hence, improves productivity. This will form a vicious cycle whereby exports increase the imports of machineries and the imported machineries will be used in the production of the exported goods.

Furthermore, before any action such as depreciation of the currency is considered, the Ghanaian government must consider carefully the conditions involved to avoid any failures like in the past years. The success of currency depreciation for Ghana depends on several conditions that include the elasticities of exports and imports of Ghana, domestic price stability meaning that, inflation should be almost non-existent, state of the global economy and the competition within the international market. Ghana's exports are largely primary products. On the other hand, her imports are of manufactured goods. Given the structure of the Ghanaian economy-exports are largely primary products and imports are solely on manufactured goods, some Ghanaian economists have argued that the economy would continue to have unfavorable terms of trade and would lose more under depreciation.

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APPENDICES

APPENDIX A:

```
. reg  dlimports dlexports dlspending dlgdp dexchangerate dlinvestment
```

Source	SS	df	MS
Model	2.8295303	5	.565906061
Residual	.745484632	47	.015861375
Total	3.57501493	52	.068750287

```
Number of obs =      53
F(  5,    47) =   35.68
Prob > F      =  0.0000
R-squared     =  0.7915
Adj R-squared =  0.7693
Root MSE      =  .12594
```

dlimports	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dlexports	.7392073	.0884298	8.36	0.000	.5613094	.9171052
dlspending	.0824483	.1309722	0.63	0.532	-.1810338	.3459304
dlgdp	.0011395	.0004257	2.68	0.010	.000283	.0019959
dexchanger~e	-.6443657	.2433001	-2.65	0.011	-1.133822	-.1549091
dlinvestment	.3248018	.0775001	4.19	0.000	.1688917	.4807118
_cons	.0300014	.0201733	1.49	0.144	-.0105821	.0705848

```
. estat durbinalt

Durbin's alternative test for autocorrelation
```

lags(p)	chi2	df	Prob > chi2
1	2.257	1	0.1330

```
                    H0: no serial correlation

. estat dwatson

Durbin-Watson d-statistic(  6,    53) =  2.38095

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of dlimports

         chi2(1)      =     1.06
         Prob > chi2  =   0.3027
```

APPENDIX B:

```
. estat durbina

Durbin's alternative test for autocorrelation
```

lags(p)	chi2	df	Prob > chi2
1	2.257	1	0.1330

```
                    H0: no serial correlation
```

APPENDIX C:

```
. reg limports dlimports dlimp2 dlimp3 dlimp4
```

Source	SS	df	MS
Model	27.4118692	4	6.8529673
Residual	73.7820044	46	1.60395662
Total	101.193874	50	2.02387747

Number of obs	= 51
F(4, 46)	= 4.27
Prob > F	= 0.0051
R-squared	= 0.2709
Adj R-squared	= 0.2075
Root MSE	= 1.2665

limports	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dlimports	5.416625	1.321605	4.10	0.000	2.756372	8.076877
dlimp2	-8.362893	2.39199	-3.50	0.001	-13.17772	-3.548067
dlimp3	5.856755	2.077724	2.82	0.007	1.674513	10.039
dlimp4	-1.588661	.728122	-2.18	0.034	-3.054294	-.123027
_cons	.0123053	.2037751	0.06	0.952	-.3978728	.4224834

```
. reg limports dlimports dlimp2 dlimp3 dlimp4 dlexports dlexp2 dlexp3 dlexp4
```

Source	SS	df	MS
Model	35.0176407	8	4.37720509
Residual	66.1762328	42	1.57562459
Total	101.193874	50	2.02387747

Number of obs	= 51
F(8, 42)	= 2.78
Prob > F	= 0.0146
R-squared	= 0.3460
Adj R-squared	= 0.2215
Root MSE	= 1.2552

limports	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dlimports	-1.836957	3.839527	-0.48	0.635	-9.585437	5.911522
dlimp2	4.097129	6.282066	0.65	0.518	-8.580593	16.77485
dlimp3	-2.553843	4.501613	-0.57	0.574	-11.63847	6.53078
dlimp4	.4328213	1.24826	0.35	0.731	-2.08627	2.951912
dlexports	8.576058	4.124485	2.08	0.044	.2525103	16.89961
dlexp2	-14.97535	7.047284	-2.12	0.040	-29.19734	-.7533527
dlexp3	10.5998	5.374805	1.97	0.055	-.246995	21.4466
dlexp4	-2.718017	1.597401	-1.70	0.096	-5.941703	.505669
_cons	-.0821513	.2072928	-0.40	0.694	-.500485	.3361825

```
. reg  lexports  dlexports dlexp2 dlexp3 dlexp4
```

Source	SS	df	MS		
Model	28.2852388	4	7.07130971	Number of obs	= 51
Residual	56.0905051	46	1.21935881	F(4, 46)	= 5.80
				Prob > F	= 0.0007
Total	84.3757439	50	1.68751488	R-squared	= 0.3352
				Adj R-squared	= 0.2774
				Root MSE	= 1.1042

lexports	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dlexports	6.005472	1.259005	4.77	0.000	3.471226	8.539718
dlexp2	-9.500586	2.343224	-4.05	0.000	-14.21725	-4.783921
dlexp3	6.913912	2.124668	3.25	0.002	2.637177	11.19065
dlexp4	-1.921153	.7761647	-2.48	0.017	-3.483491	-.358814
_cons	-.279316	.1813352	-1.54	0.130	-.6443249	.0856928

```
. reg  lexports  dlexports dlexp2 dlexp3 dlexp4 dlimports dlimp2 dlimp3 dlimp4
```

Source	SS	df	MS		
Model	30.3833555	8	3.79791944	Number of obs	= 51
Residual	53.9923884	42	1.28553306	F(8, 42)	= 2.95
				Prob > F	= 0.0103
Total	84.3757439	50	1.68751488	R-squared	= 0.3601
				Adj R-squared	= 0.2382
				Root MSE	= 1.1338

lexports	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dlexports	9.962154	3.725504	2.67	0.011	2.443783	17.48052
dlexp2	-16.09347	6.365566	-2.53	0.015	-28.93971	-3.24724
dlexp3	11.01322	4.854874	2.27	0.029	1.215692	20.81076
dlexp4	-2.778149	1.442877	-1.93	0.061	-5.689992	.1336945
dlimports	-3.779206	3.468111	-1.09	0.282	-10.77814	3.219725
dlimp2	6.102967	5.674371	1.08	0.288	-5.348378	17.55431
dlimp3	-3.62033	4.06615	-0.89	0.378	-11.82615	4.585493
dlimp4	.6765615	1.12751	0.60	0.552	-1.598846	2.951969
_cons	-.2909046	.1872403	-1.55	0.128	-.6687709	.0869617

APPENDIX D:

```
. varsoc limports lexports lgdp linvestment lspending exchangerate

   Selection-order criteria
   Sample:  1964 - 2013                        Number of obs     =        50
```

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-334.543				.03319	13.6217	13.7091	13.8512
1	-73.5761	521.93	36	0.000	4.1e-06*	4.62304*	5.23465*	6.22914*
2	-41.4755	64.201	36	0.003	5.2e-06	4.77902	5.91487	7.76177
3	-3.14638	76.658	36	0.000	5.6e-06	4.68586	6.34594	9.04527
4	23.311	52.915*	36	0.034	.000012	5.06756	7.25189	10.8036

```
   Endogenous:  limports lexports lgdp linvestment lspending exchangerate
    Exogenous:  _cons

. tsset year, yearly
        time variable:  year, 1960 to 2014
                delta:  1 year

. vecrank limports lexports lgdp linvestment lspending exchangerate, trend(trend) lags(1)

                    Johansen tests for cointegration
Trend: trend                                         Number of obs =      53
Sample:  1961 - 2013                                       Lags =       1
```

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	12	-116.9348	.	106.4148	104.94
1	23	-99.192491	0.48805	70.9302*	77.74
2	32	-85.775264	0.39728	44.0957	54.64
3	39	-77.067844	0.28006	26.6809	34.55
4	44	-68.859366	0.26637	10.2639	18.17
5	47	-64.356033	0.15628	1.2573	3.74
6	48	-63.727393	0.02344		

```
. reg  dlimports dlexports dlgdp  dlspending dexchange dlinvestment  c.dlgdp#c.dlexports
```

Source	SS	df	MS	Number of obs =	53
				F(6, 46) =	33.40
Model	2.90764446	6	.484607409	Prob > F =	0.0000
Residual	.66737048	46	.014508054	R-squared =	0.8133
				Adj R-squared =	0.7890
Total	3.57501493	52	.068750287	Root MSE =	.12045

dlimports	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
dlexports	.684942	.0877471	7.81	0.000	.5083163	.8615677
dlgdp	.0014989	.0004356	3.44	0.001	.0006221	.0023758
dlspending	.1222219	.1264276	0.97	0.339	-.1322637	.3767075
dexchange	-.6715954	.232985	-2.88	0.006	-1.14057	-.2026209
dlinvestment	.3114665	.0743426	4.19	0.000	.1618226	.4611105
c.dlgdp# c.dlexports	-.0032586	.0014043	-2.32	0.025	-.0060853	-.0004318
_cons	.0435672	.0201598	2.16	0.036	.0029875	.0841468